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ABSTRACT

A study of biliteracy focuses on discourse as the unit of analysis needed to understand the task facing bilingual students. It investigated the way in which 22 high school students representing six different language groups in a bilingual basic skills course struggled with scientific language in an experiment on the community's drinking water. Most students were not literate and had had no previous science experience. During the investigation, students began to appropriate the intentional possibilities of language in order to construct scientific meanings and resolve a dilemma posed by the evidence at hand. It is concluded that while in traditional book-based bilingual education, students are expected to assimilate decontextualized language, this active learning approach causes students to construct both language and content knowledge by confronting authentic dilemmas. A 34-item bibliography is included. (MSE) (Adjunct ERIC Clearinghouse on Literacy Education)

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DISCOURSE AND SOCIAL PRACTICE; LEARNING TO USE LANGUAGE IN BILINGUAL CLASSROOMS

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Discourse and Social Practice:

Learning to Use Language in Bilingual Classrooms

This chapter is broadly about literacy or, more properly, *literacies*. Taking as our starting point the discussions of biliteracy in many of the chapters in this volume, we hope to contribute to the elaboration of the meaning of biliteracy by exploring the pluralistic and socially embedded nature of literacy. In these chapters biliteracy has been explored from linguistic, political, and sociocultural perspectives. We will extend the focus on language – first and second languages – expressed in these chapters to a focus on discourse as the unit of analysis needed to understand the complexity of the task facing bilingual students.

Knowing a language, any language, means knowing more than *the* English language or *the* Spanish language or any other language for that matter. Each language is really many languages, a set of possible discourses people use to communicate with one another in their daily activity (Bakhtin,1981). These discourses in turn each constitute a set of beliefs and values in terms of which one speaks, thinks and acts (Gee, 1989). The particular discourse worlds we inhabit will depend on our history, the books we have read, the people with whom we have talked and from whom we have learned, the social circles in which we have moved, our economic class, our generation, our epoch, the institutions (church, political party, schools, societies) to which we have belonged, and so forth. As the Soviet theorist, Mikhail Bakhtin (1981, p. 291), explains:

> At any given moment of its historical existence, language ... is heteroglot from top to bottom: it represents the co-existence of socio-ideological

> contradictions between the present and the past, between differing epochs of the past, between different socio-ideological groups in the present, between tendencies, schools, circles and so forth, all given a bodily form. These "languages" of heteroglossia intersect each other in a variety of ways, forming new socially typifying "languages."

The idea that language is heteroglot poses some difficulties for both our common sense and technical uses of the term "literacy." In both senses, the term is often used to suggest a capability that is unitary and univocal rather than pluralistic and multivocal (although the varied definitions of literacy that abound in the literature are perhaps a clue to its inherent diversity). In the same vein, literacy often is defined in terms of mastery of certain general skills – reading, writing, arithmetic skills – rather than in terms of mastery of whole systems of meaning and practices, each involving a set of beliefs and values or, in Bakhtin's term, an *ideology*.

From this perspective, the task facing the second language learner – and, specifically in this culture, the learner of English – is enormously complex. Learning English in school really means appropriating whole systems of meaning involved in such school tasks as reading and answering questions about stories, talking to the teacher, taking tests, playing with other students in the schoolyard, doing mathematics, doing science, doing history, and so on. But in many, if not most schools, this pluralistic perspective is not enacted; English – that is, grammar and vocabulary – is the real subject of instruction, whether in ESL, science or social studies. It is presented as a ready-made and neutral system that the learner is meant to assimilate through practice and memorization.

In our work we are trying to understand how language minority students begin to *appropriate* a new discourse, specifically scientific discourse (Rosebery, Warren & Conant, 1990-a; Rosebery, Warren & Conant, 1990-b; Warren, Rosebery & Conant, 1989). In collaboration with bilingual teachers, we are working to create communities of authentic scientific practice in language minority classrooms; that is, communities in which students do science in ways that practicing scientists do. In this context, science is organized as a socially embedded activity in which students pose their own questions, plan and implement research to explore their questions, collect, analyze and interpret data, build and argue theories, draw conclusions and, in some cases, take actions based on their research. We stress the notion of *appropriation* because we see the learner as essentially finding ways to take the sense-making practices of science and make them his or her own, tuning them to his or her own intention, his or her own sense-making purposes.

The complexity of the appropriation process cannot be overstated, as Bakhtin (1981, p. 293-294) explains:

> (The word in language) becomes "one's own" only when the speaker populates it with his own intention, his own accent, when he appropriates the word, adapting it to his own semantic and expressive intention. Prior to this moment of appropriation, the word...exists in other people's mouths, in other people's contexts, serving other people's intentions: it is from there that one must take the word, and make it one's own. And not all words for just anyone submit equally easily to this appropriation, to this seizure and transformation into private property: many words stubbornly resist, others remain alien, sound foreign in the mouth of the one who appropriated them and who now speaks them; they cannot be assimilated into his context and fall out of it; it is as if they put themselves in quotation marks against the will of the speaker. Language is not a neutral medium that passes freely and easily into the private property of the speaker's intentions; it is populated – overpopulated – with the intentions of others. Expropriating it, forcing it to submit to one's own intentions and accents, is a difficult and complicated process.

For language minority students, the appropriation process can be even more arduous than for other students, for the distance they must travel between discourse worlds is often far greater. They keenly feel the conflict between American viewpoints, values, and beliefs and those of their own culture, perhaps the most well researched example of this being the emphasis in American schools on individual as opposed to collective action (Au, 1980; Au & Jordan, 1981; Mohatt & Erickson, 1980; Philips, 1972).

What makes appropriation so difficult is that discourses are inherently ideological; they crucially involve a set of values and viewpoints in terms of which one speaks, acts, and thinks (Bakhtin, 1981; Gee, 1989). As a result, discourses are always in conflict with one another in their underlying assumptions and values, their ways of making sense, their viewpoints, the objects and concepts with which they are concerned. Each gives a different shape to experience. Therefore, appropriating any one discourse will be more or less difficult depending on the various other discourses in which students (and their teachers) participate.

From this perspective, then, we do not define scientific literacy as the acquisition of specific knowledge ("facts") or skills, nor even from a cognitive perspective as the refinement of a mental model. Rather we understand scientific literacy to be a socially and culturally produced way of thinking and knowing, with its own sense-making practices, its own values, norms, beliefs, and so forth. In this light, when students participate in a community of scientific practice, they begin to appropriate not scientific "facts" but socially mediated ways of knowing, thinking, and

using language (both first and second languages) to construct scientific meanings. Our belief is that this discourse perspective is necessary if we are to understand how schools can better meet the challenge of educating bilingual students.

In this chapter we will explore the efforts of some high school students to make sense of data they collected about the quality of their community's drinking water. The focus of our analysis will be on the relationship between voice and social practice, in particular, how the students struggled to appropriate a scientific voice as they constructed scientific meanings. As part of this analysis, we will contrast the uses of language that emerged in the context of authentic scientific practice on the one hand and conventional school practice on the other. In the conclusion, we will explore more broadly the educational implications of the analysis for language minority students.

Background

Before launching into the details of the case, some background on what we mean by communities of authentic scientific practice is needed. First, we ground our work in the research literature. Secondly, we outline a perspective on scientific practice that draws on several sources, including the reflections of practicing scientists and ethnographic studies of laboratory life. Finally, we offer a general approach to building communities of scientific practice in the bilingual classroom.

A new conceptualization of learning is emerging in the research literature (Brown & Campione, in press; Brown, Collins & Duguid, 1989; Lampert, 1990; Lave, 1988; Resnick, 1989; Schoenfeld, in press-a, in press-b). Drawing heavily on Vygotsky (1978, 1985) and on anthropological perspectives on learning and cognition (Geertz, 1973, 1983; Lave, 1988), this literature views learning as an inherently cognitive and social activity. The child appropriates new forms of discourse, knowledge, and reasoning through his or her participation in socially defined systems of activity. As Resnick (1989) has recently argued, education may be better thought of as a process of socialization, rather than instruction, into ways of thinking, knowing, valuing, and acting that are characteristic of a particular discipline.

Central to this view is the idea that concepts are constructed and understood in the context of a community or culture of practice; their meaning is socially constituted (Brown, et al., 1989). Within this community, moreover, practitioners are bound by complex, socially constructed webs of belief which help to define and give meaning to what they do (Geertz, 1983). As Mehan (in press) has noted, members of a community "can not make up meanings in any old way." Rather, they build up ways of knowing, talking, acting, and valuing, which help to constrain the construction of meaning within the discipline. Within this framework, the learner is conceptualized as one who appropriates new forms of knowledge through apprenticeship in a community of practice (Brown & Campione, in press; Brown et al., 1989; Collins, Brown & Newman, 1989; Lampert, 1990; Lave, 1988; Resnick, 1989; Rosebery et al.,

1990-a; Rosebery et al., 1990-b; Schoenfeld, in press-a, in press-b; Warren et al., 1989).

What, then, is the nature of scientific practice? For the Nobel Laureate, scientist, Sir Peter Medawar (1987, p. 129), scientific sense-making is a kind of storytelling:

> Like other exploratory processes, (the scientific method) can be resolved into a dialogue between fact and fancy, the actual and the possible; between what could be true and what is in fact the case. The purpose of scientific enquiry is not to compile an inventory of factual information, nor to build up a totalitarian world picture of Natural Laws in which every event that is not compulsory is forbidden. We should think of it rather as a logically articulated structure of justifiable beliefs about a Possible World – a story which we invent and criticize and modify as we go along, so that it ends by being, as nearly as we can make it, a story about real life.

Medawar's use of the story metaphor represents a bold challenge to both typical school beliefs about what it means to be scientifically literate and the larger culture's assumptions about the nature of scientific knowledge. First, he challenges the belief that science, at bottom, is the discovery of a reality that exists "out there," pregiven but hitherto concealed (cf. Latour & Woolgar, 1986). Secondly, he challenges the belief that scientists work according to a rigorously defined, logical method, known popularly as The Scientific Method. And thirdly, through his emphasis on story building, he challenges the belief that scientific discourse – the construction of scientific meaning – is represented uniquely by forms of writing and talk that are thoroughly objective and impersonal.

Central to Medawar's vision is an idea of scientific practice in which creativity and construction – rather than discovery – predominate. His

language suggests that science is projective rather than objective: scientists build stories about a *Possible* World, they do not discover the truth that already exists "out there." Further, he insists on the dialogic quality of scientific activity: fact and fancy, invention and criticism interacting.

Contemporary sociological and anthropological studies of the nature of scientific activity in laboratory settings add an explicit social dimension to this picture (Knorr-Cetina & Mulkay, 1983; Latour, 1987; Latour & Woolgar, 1986; Longino, 1990; Lynch, 1985). These studies show that scientists construct and refine their ideas within a community in which they transform their observations into findings through argumentation and persuasion, not simply through measurement and discovery. The apparent "logic" of scientific papers is really the end result of the practice of a group of scientists whose goal is to eliminate as many alternative interpretations as possible to their account of the phenomena being studied. (It is hard not to hear an echo of Medawar's storytelling in this.) Through the "superimposition of inscriptions" (Latour & Woolgar, 1986) – graphs, notes, statements, drafts of papers, published papers – accounts are constructed, claims are negotiated, analogies are sought, arguments are put forward and defended against attack, and objections are anticipated. As Latour and Woolgar (1986) show, the scientists they studied claimed merely to be discovering facts but close observation revealed that they were writers and readers in the business of being convinced and convincing others. Throughout this process, the "facticity" of statements is in constant flux as statements are evaluated and re-evaluated. Rather than the orderly, logical and coherent process that is described in science textbooks as The Scientific Method, actual scientific practice entails making sense

out of frequently disorderly observations and negotiating among alternative interpretations. However, once a statement or account has stabilized, all traces of its production are eliminated and, as in journal articles, it appears that reality is the cause rather than the consequence of its construction.

Through our work with bilingual teachers and students, we are attempting to elaborate an approach to science teaching and learning that supports the development of classroom communities of authentic scientific practice. This approach entails a radically different orientation to teaching and learning than that found in traditional classrooms, one in which students construct their scientific understanding through an iterative process of theory building, criticism and refinement organized around their own questions, hypotheses and data analysis activities. Fundamentally, the idea is to place question posing, theorizing and argumentation at the heart of students' scientific activity. Students explore the implications of the theories they hold (sometimes called 'naive' theories), examine underlying assumptions, formulate and test hypotheses, develop evidence, negotiate conflicts in belief and evidence, argue alternative interpretations, provide warrants for conclusions, and the like. Conceptually, they investigate their own questions and the beliefs or theories from which they derive; and epistemologically, they explore relationships among truth, evidence and belief in science. They, in short, become authors of ideas and arguments (cf. Lampert, 1990; Warren et al. 1989).

In practice, the approach is one of collaborative inquiry. The heart of the approach is for students to formulate questions about phenomena for which

they have some prior belief (e.g., Is our school's water safe to drink? Is the air temperature hottest at noon? Is salt consumption related to physical fitness?). They then build and criticize theories, collect and analyze data, evaluate hypotheses through experimentation, observation, and measurement , and interpret and communicate their findings.

More than simply involving students in hands-on science, the classrooms evolve into communities in which scientific sense-making is actively practiced. Toward this end, investigations are also collaborative, just as most authentic scientific activity is. The emphasis on collaborative inquiry reflects our belief, building on Vygotsky (1978), that robust knowledge and understandings are socially constructed through talk, activity and interaction around meaningful problems and tools. Collaborative inquiry provides direct cognitive and social support for the efforts of a group's individual members. Students share the responsibility for thinking and doing, distributing their intellectual activity so that the burden of managing the whole process does not fall to any one individual. The distribution and sharing of intellectual responsibility is particularly effective for language minority students, for whom the language demands of tasks are often overwhelming and can often mask their abilities and understanding. In addition, collaborative inquiry creates powerful contexts for constructing scientific meanings. In challenging one another's thoughts and beliefs, students must be explicit about their meanings; they must negotiate conflicts in belief or evidence; and they must share and synthesize their knowledge in order to achieve a common goal, if not a common understanding (Barnes & Todd, 1977; Brown & Palincsar, 1989; Hatano, 1981; Inagaki & Hatano, 1983).

Finally, investigations are interdisciplinary; science, mathematics and language (talk, reading, and writing) are intimately linked. Mathematics and language are recognized as essential tools of scientific inquiry, which stands in sharp contrast to traditional schooling in which science is separated from math and the role of language in each is hardly acknowledged. The importance of an interdisciplinary approach cannot be overstated with regard to language minority students. It involves them directly in the kinds of purposeful, communicative interactions that promote genuine language use, which arguably are the most productive contexts for language acquisition, such as talking in the context of doing science and trying to solve a meaningful problem. It also creates opportunities for students to use the languages of science and mathematics in ways that schools and the society at large require: not just to read textbooks or do computations, but to write reports, argue a theory, develop evidence, and defend conclusions.

Bacteria Study

To illustrate the approach, we offer an example taken from a bilingual Basic Skills class in a large urban high school. There were 22 students in the class representing six different language groups: Haitian Creole, Spanish, Portuguese, Amharic, Tigrinye, and Cape Verde Creole. The students were for the most part recent immigrants who knew little or no English. Many could not read or write in their first languages. Most had acquired only basic mathematical skills (e.g., addition and subtraction) and had no previous experience with science.

During the spring the class studied a local pond bordering the city's water reservoir. On an earlier trip to the pond, the students had been struck by its poor condition as well as its proximity to the city's drinking water supply. An empty oil barrel and a shopping cart sat in the shallows; bottles and broken glass littered the shore; the water was murky and slick with oil. The students wondered how the pond came to be a dumping ground and if it posed any hazard to the city's water supply.

In the context of their field study, the students analyzed some of the pond's chemical, biological, and physical characteristics. They also investigated the city's water supply, learning about its sources, how it is purified, and how it is piped throughout the city. Groups of students took responsibility for different aspects of the study.

As part of their spring investigation, the students compared the bacteria level of the pond to the level of their community's tap water. They were interested in two things: How much bacteria was in the pond? How much bacteria was in their drinking water? They collected water samples from the pond and brought them back to the classroom. They also brought in samples of their home tap water and sampled several drinking fountains in the school.

To determine the bacteria levels in these different water sources, they performed a test for fecal coliform using commercially available culture kits called Millipore™ samplers. A Millipore™ sampler consists of an absorbent, nutrient-filled pad which fits into a plastic holder. The pad is

marked with a grid. To test for bacteria, the pad is immersed in a water sample, placed inside the plastic holder, and incubated for twenty-four hours. At the end of twenty-four hours, the grid on the pad is inspected for bacteria colonies which appear as tiny black, blue, or green spots. A pamphlet accompanying the samplers allows the user to assign a water quality grade based on the number of colonies that grow. To be drinkable, water must have a count of zero.

The students grew cultures from pond water, home tap water, and school water. However, many of the cultures did not take, possibly because of inadequate incubation. (The precise reasons were never determined.) A few survived, however, and one Haitian student, Rose, used them as the basis for investigating the bacteria level in the city's tap water.

Rose's first step was to document the results from a successful home tap water culture. In her lab notebook, she drew a facsimile of the Millipore™ sampler and reproduced the position and size of each of the 57 bacteria colonies that had grown (see Figure 1). This entailed meticulous attention to detail. The grid, as you can see in the figure, measures only 1.75 X 3", and the colonies are best seen under magnification. Working carefully from the sampler, Rose produced an accurate rendering of the culture.

----- Insert Figure 1 about here -----

Rose's findings corroborated an estimate of 60 given earlier by another student who had examined the sampler with a hand lens. While she was pleased that her results were confirmed by the earlier estimate, her

contentment was quickly overshadowed by her realization of their significance. According to the standards stated in the Millipore™ pamphlet, the tap water, which had come from a student's home, was not fit to drink. She proceeded to document her finding in English, as shown in the figure.

Rose's report, brief as it is, utilizes different kinds of information, and draws on diverse resources and voices to communicate her finding and its significance. In it, she puts the reader in contact, even if only implicitly, with other texts such as the written standards that accompany the Millipore™ samplers. She documents her narrative with representations (both graphical and numerical) of the culture, thereby adding to the credibility of her report and interpretation. She describes how she came to her results, emphatically marking them as the product of her own activity through use of the first person authorial voice ("I counted..." "I find..."). Through this use of voice, Rose marks the "finding" as a personal construction; it does not exist apart from her agency.

It is interesting that, when interpreting the data according to the standards, Rose switches from the first person to the more authoritative, objective voice signalled in: "That's mine (That means) you can't not drinking but you can swim on that water. Grade B for that water because whole body contact no more than 200/100 ml." Here she is appropriating the words of the Millipore™ pamphlet to interpret her finding and to inform others of its significance: the water used in this sample is fit for whole body contact but not for drinking. (Grade B water, which is suitable for whole body contact such as swimming, can contain a bacterial count of 1-200

colonies per 100 ml of water.) The switch in voice suggests Rose's awareness of the need for credibility; reference to the water quality standards stated in the pamphlet lend her argument a validity it would not otherwise have.

From our perspective, what stands out in this episode is the way in which Rose has taken control of the bacteria study, shaped it to her own purposes and taken a point of view, and then interpreted her activity and its significance for a larger community. The mixed levels of description and explanation, the orchestration of multiple voices, the recourse to standards and multiple representations reflect her own efforts at sense-making and belie the surface simplicity of her report. These sense-making efforts reflect her struggle to appropriate scientific ways of thinking, knowing and writing, in short, to forge a scientific voice. She is working through for herself the relationship between the processes by which she produced her finding and the means for communicating that finding. This effort is a key aspect of scientific practice, one that is well-known to anyone who has struggled to craft a "story" about one's data. That Rose does this in English, by her own choice, only adds to the complexity of her task.

Around the time of the bacteria study, the class as a whole was preparing for a field trip to the city's reservoir and water treatment facility. The students were told that at the end of the trip they would have a chance to ask questions of the city's water chemist. In preparation for the trip, many of the students read a booklet, "The Story of Water," prepared by the city's Water Department. It explained in pictures and words the water cycle and water treatment process. The teacher guided the students in developing the

following kinds of questions based on their reading of the booklet, which the students then copied into their notebooks:

"What machines are used to purify water?"
"What is chlorination?"
"What is filtration?"

These questions are typical of those often asked of students in school. To hark back to the introduction, "it is as if they put themselves in quotation marks against the will of the speaker" (Bakhtin, 1981). The question arises: Whose questions are they? Why are they being asked? Clearly, they are not questions for which the answer is unknown or genuinely sought. Rather they seek to test comprehension of information readily available in some external authority such as a text or dictionary or in this case, the Water Department's booklet. The focus is on defining technical terms, not on constructing knowledge or solving a problem. The lack of student agency and purpose is perhaps most clearly reflected in the impersonal, objective voice in which the questions are cast. There is no sense of ownership, of the students as agents in their own learning.

In contrast, Rose and another student, Marie, used the bacteria results as the basis for developing questions designed to pursue the full implications of those findings. Not surprisingly, their questions differed markedly from those of their classmates, in both substance and tone:

"I went a (sic) know how come bacteria come in the water?"
"How come they clearn (sic) the water but it still has bacteria in it?"
"I went to know how often they clean the water?"

Through these questions, Rose and Marie are assuming an active, critical stance towards language use. In a very real sense, their discourse is an action, asserting a will to know ("I went to know..."). It is also productive, literally putting into question the dilemma posed by Rose's findings ("How come they clearn (sic) the water but it still has bacteria in it?") and seeking to resolve it. Unlike the class' questions, these questions are openly evaluative, expressing a particular point of view. Moreover, to construct them, Rose and Marie had to engage the problem of communication directly, determining their attitude towards the bacteria findings, judging their audience and, based on these, determining their modes of expression. Their struggle is reflected directly in their choice of pronouns. Rose and Marie actively take on the role of interrogator through use of the first person ("I went to know..."). However, they do not then directly address the water chemist; rather they use the adversarial, impersonal third person plural "they" ("I went a [sic] know how often they clean the water."). The struggle evidenced here is somewhat ambiguous. It is possible that they are not entirely sure who their audience is, the water officials, the teacher or both, and so they find themselves caught between two discourse worlds, that of the school and that of their own scientific practice. Alternatively, it is possible that the water chemist represents for them an anonymous authority since they have not yet met him. The ambiguity, however, hints at an important point. Rose and Marie's words are not entering into a vacuum, but a "tension-filled environment" (Bakhtin, 1981, p. 276), potentially charged with different points of view and conflicting values: theirs and those of the water officials. Through their questions, Rose and Marie are active particpants in social dialogue.

It is precisely this kind of struggle – involving various kinds and levels of evaluation – that constitutes authentic language use and determines the expressive aspect of speech (Holquist, 1990). It is typically absent from most work in schools where language is treated as objective and neutral, as a set of authoritative forms to be learned and assimilated, and not as a socially constructive process that takes place between speakers,. Rose and Marie's questions are not merely assertive in form, they are real assertions in a chain of activity and communication designed to produce real answers. It is also interesting how form can belie content. Notice that although the class' questions look "factual" (i.e., seeking authoritative definitions for technical terms), they are not factual in the scientific sense (i.e., based on scientific evidence). In contrast, although Rose and Marie's questions sound "personal," they are grounded scientifically.

Through their scientific activity, Rose and Marie began to appropriate language to their own intention in order to resolve the dilemma raised by their inquiry and reflected in the question: "How come they clearn (sic) the water but it still has bacteria in it?" Marie's attitude towards this contradiction was a mixture of indignation and excitement. She marvelled in class that her town's water, which was supposed to be clean, could have bacteria in it. On the field trip, she looked forward to the opportunity to confront the authorities at the water treatment plant with her evidence that things were not as they should be. In short, she felt empowered by her knowledge. Unfortunately, the eagerly anticipated question-and-answer period never materialized because the plant tour went on longer than expected. So bitter was Marie's disappointment that in an interview

conducted two months later, she referred to the water treatment plant as "the place we were going to ask the people questions and we didn't get to."

Ironically, Marie's frustration reveals the power of her experience. Like Rose, she had appropriated the results of the bacteria study, their meaning being most forcefully expressed in the questions the two girls prepared for the field trip. Marie's ownership, like Rose's, resulted from having thought seriously about the implications of the data for the quality of drinking water in her town and having prepared to confront the authorities about them. That Marie was still thinking about her missed opportunity at the end of the year, weeks after the investigation, suggests that she internalized what she had learned about water quality and experimental analysis on the one hand and the inherent conflict between scientific practice and school practice on the other.

Conclusion

In this chapter we have explored the multivocal nature of literacy both in theory and in practice. In the bacteria investigation, we saw how the students began to appropriate the intentional possibilities of language in order to construct scientific meanings and resolve the dilemma posed by the evidence they had developed. We saw also how Rose and Marie's struggle to orient themselves in a heteroglot environment contrasted markedly with the rest of the class' work, in which words were treated as if their meanings resided in dictionaries rather than in concrete sociohistorical contexts. In the former case, the language used is authoritative; it is distanced from the students' own sense-making (Emerson, 1986). In the

latter case, the students are actively constructing meaning; in Bakhtin's terms, they are developing "internally persuasive" discourse. As Caryl Emerson (1986) suggests, this struggle between authoritative and internally persuasive discourse is a key to intellectual growth.

The perspective on language we have outlined helps reframe the problem of learning in multilingual and multicultural contexts. It recognizes the inextricable connection of language to social practice, emphasizing first the pluralistic nature of language and, secondly, the idea that all languages or discourses are specific points of view on the world, each characterized by its own objects, meanings and values (Bakhtin, 1981, p. 293):

> For any individual consciousness living in it, language is not an abstract system of normative forms but rather a concrete heteroglot conception of the world... Each word tastes of the context and contexts in which it has lived its socially charged life; all words and forms are populated by intentions.

In this view, the learner appropriates new ways of knowing through active participation in a community of practice (Brown et al., 1989; Collins et al., 1989; Lave, in preparation). These ways of knowing are not reducible to specialized vocabularies or specific forms for expressing explanations. Rather they represent whole systems of meaning permeated with specific values and accents.

This perspective on language, as we have tried to suggest, carries important implications for learning. It suggests a view of learning which differs in fundamental ways from traditional schooling in which lecture and textbooks are the foundation and the preferred social unit is the individual. In bilingual contexts, this model is often more extreme when

applied to subjects like science and ESL (English as a Second Language); the result is an emphasis on assimilating decontextualized vocabulary, grammar, and facts. In a community of practice, in contrast, the ways in which students do science or any other subject closely parallel the ways in which practitioners do them. In the process, students construct their knowledge by confronting authentic dilemmas, arguing alternative interpretations, posing questions, establishing standards of evidence, and exploring modes of argumentation. We think that the example of Rose and Marie illustrates this approach to learning, one that is richer, more effective and ultimately more empowering.

In this chapter we have tried to present a view of language and learning that, together with the other chapters in this book, reframes what it means to learn and to use language. Further, it directly calls into question some of the educational practices that predominate in bilingual and ESL classrooms. Rather than seeing language as a static, unitary and abstract system, it sees language as dynamic, multivocal, and socially and historically situated. This perspective helps us to understand diversity as a fundamental aspect of human nature, a strength to be cultivated rather than a problem to be solved.

> At any given moment of its evolution, language is stratified not only into linguistic dialects in the strict sense of the word (according to formal linguistic markers, especially phonetic), but also - and for us this is the essential point - into languages that are socio-ideological: languages of social groups, "professional" and "generic" languages, languages of generations and so forth. And this stratification and heteroglossia, once realized, is not only a static invariant of linguistic life, but also what insures its dynamics: stratification and heteroglossia widen and deepen as long as language is alive and developing. (Bakhtin, 1981, pp. 271-2)

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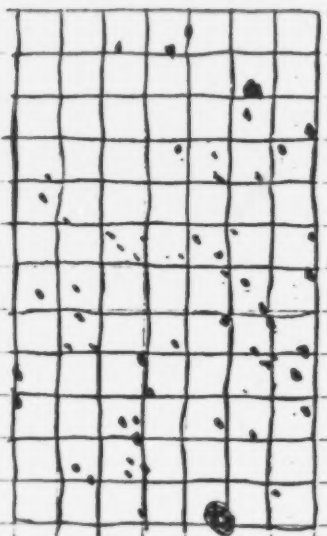
6.



57

I counted the bacteria in the ~~ocean~~ tap water
I find fivety seven bacteria in the ~~ocean~~ tap
water. That's mine you can't not drinking
but you can swim on that water
Grade B for that water because whole body
contact no more than 200/100 ml